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# EUROPEAN PATENT APPLICATION

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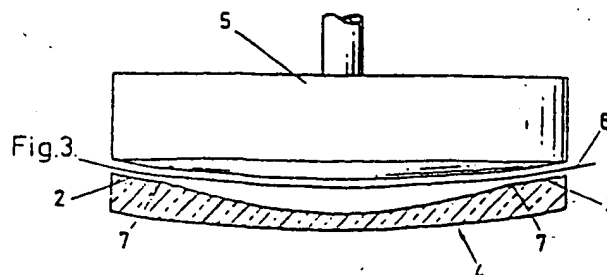
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(54) Method for manufacturing a spectacle-glass for myopes.

(57) In accordance with the desired diopter value, the required curvature, and with torus-like grinding, the so-called cross-curvature is computed, and according to the desired field of view, a second curvature is computed, whereafter the glass is arranged in a generator and a center hollowing (3) is milled according to the basic curvature, while thereafter the glass edge (2) around the center hollowing (3) is milled according to said second curvature, and the center hollowing (3) of the

thus-machined glass is finished, respectively polished, by using a tool with convex radiusing which corresponds to the basic curvature, whereafter the edge (2) is subjected to at least one finishing operation and one polishing operation by using an implement with a convex radiusing which corresponds to said second curvature, whereby moreover use is made of a resilient intermediate part between said implement and a finishing pad, respectively polishing pad.



Method for manufacturing a spectacle-glass for myopes.

This invention relates to a method for manufacturing a spectacle-glass for myopes, whereby one starts from a semi-finished glass, that is a glass which has on the inner  
5 side, a slight concave hollowing.

Myopes with severe eye divergences and with a requirement for high diopter values, have up to now always been helped with glasses which always have a thick edge thickness. The disadvantages thereof are clear: the glasses are unaes-  
10 thetic; the frame selection is limited; the glasses are heavy and make the spectacles uselessly heavier. Moreover these conditions influence the field of view due to forming disturbing concentric circles resulting from the light refraction in the glasses.

15 It has already been proposed to lower the glass edge thickness. In spite of the techniques being used, the edge thickness lowering had a detrimental action on the field of view or on the aesthetic appearance.

20 Such an example lies in the technique as described in the Swiss Patent 634,928 in the name of W. Wrobel, whereby there may be obtained but a field of view which is markedly narrower than the optimum field of view required in relation with the diopter value.

25 A search was also made for solutions which optimize the field of view as well as they satisfy the requirements from the aesthetic point of view. Belgian Patent 899,955 filed on June 19, 1984 in the name of the Applicant, comprises an attempt in such a direction. According to said Patent, the

optimum field of view is obtained or retained with a marked lowering from 40 to 51% of the edge thickness and a convex finishing of the transition between the center concave hollowing of the spectacle-glass and the flat milled edge.

5                   There was obtained hereby the object of an optimum field of view together with still a substantial improvement from the aesthetic point of view, that is an already strongly lowered edge thickness and avoiding the aesthetically-disturbing bull's eye effect.

10                   The accent fell thereby on the first object. Not all the aesthetic requirements could be satisfied.

                  The glasses did show namely still some disturbing edge thickness, while the eye of the spectacle wearer in the field of view was perceived as reduced by the person standing  
15                   directly facing the spectacle wearer.

                  Moreover the convexly-rounded transition between the flat edge and the concavely-hollowed center portion still remained too abrupt, which still had for the user a disturbing effect, as the usable field of view merged substantially without  
20                   transition with the glass edge. Said transition and edge did remain an obstacle for the spectacle wearer.

                  The technique used according to said Patent did not moreover allow any inner torus-like grinding, which often made arranging the glasses in a frame difficult and was  
25                   detrimental to the final aesthetic appearance of the spectacle.

                  Now all the myopes do not have the same need and do not bring the same requirement for an optimum field of view. Some myopes choose a more aesthetic spectacle glass, even then with some loss in the field of view, while some  
30                   other myopes still have no requirement regarding that field of view which is being considered as optimum for the normal myope. Every user of a spectacle-glass wants however as much as possible to have the disturbing refraction effect between

field of view and edge be reduced.

The invention has now for object to obviate such drawbacks and other ones from a normal spectacle-glass for myopes with high diopter value, and to provide a method  
5   wherewith it is possible to offer to the myopes a number of alternatives unobtainable up to now, that is glasses with optimum aesthetic qualities and retaining a field of view which is adapted to the individual expectations and living conditions of every person.

10           For this purpose, the method according to the invention has for characteristic that in accordance with the desired diopter value, the required curvature, and with torus-like grinding, the so-called cross-curvature is computed, and according to the desired field of view, a second curvature is computed,  
15   whereafter the glass is arranged in a generator and a center hollowing is milled according to the basic curvature, while thereafter the glass edge around the center hollowing is milled according to said second curvature, and the center hollowing of the thus-treated glass is finished, respectively  
20   polished, by using a tool with convex radiusing which corresponds to the basic curvature, whereafter the edge is subjected to at least one finishing operation and one polishing operation by using an implement with a convex radiusing which corresponds to said second curvature, whereby moreover use is made of  
25   a resilient intermediate part between said implement and a finishing, respectively polishing pad.

According to the invention, use may be made for the resilient intermediate part, of a material with a resiliency which is enough to finish the edge about the center bore.

30           An advantageous embodiment of the method according to the invention lies in using for the intermediate part, a material which is water-impermeable at least on that side which will engage the finishing or polishing pad.

To obtain the desired result with a minimum number of operations, a pressure may be exerted on the intermediate part which is high enough to finish convexly the edge about the center hollowing and the transition between the center hollowing and the edge.

Other details and advantages of the invention will stand out from the following description, given by way of non limitative example and with reference to the accompanying drawings, in which:

Figure 1 is a cross-section through a semi-finished glass which is used as starting material, whereby a dotted line shows the curvature A for the desired diopter value.

Figure 2 is a cross-section through a glass with a center hollowing according to curvature A, and shown in dotted line, the curvature B wherefrom the desired field of view is obtained.

Figure 3 is a cross-section through a glass as shown in figure 2, after treatment, with opposite thereto an implement and a finishing pad for the machining of the glass center hollowing.

Figure 4 is a cross-section through a glass with a center hollowing giving the desired diopter value, together with an implement with a convex cross-section according to curvature B, and a resilient-material intermediate part, and a finishing or polishing pad.

Figure 5 is a cross-section through a finished glass according to the invention.

The method which is shown by the various figures, comprises a series steps which lead with a minimum number of operations, to a spectacle-glass with very divergent properties, mainly characterized by a substantial improvement in the aesthetic appearance.

In the first step, for simplicity sake, one starts

with a semi-finished glass 1 from synthetic or mineral material. Such a semi-finished basic product is slightly hollowed on the inner side. It would naturally also be possible to start with a raw glass, but then a semi-finished glass would first  
5 have to be ground therefrom.

Depending on the desired diopter value, the basis curvature A is computed. With torus-like grinding, the so-called cross-curvature is also computed.

Independently from the diopter computing, the  
10 field of view wherewith the curvature B corresponds, is further also computed.

In the usual way, the glass to be machined is secured in a generator. The hollowing which corresponds to curvature A, is then milled out. Directly thereafter, the  
15 glass edge is milled along curvature B. Due to the larger curvature radius, but the margin portion 2 is then machined. There is thus formed what may be considered as the center hollowing 3, the curvature radius of which is determined by the required diopter value. The center middle portion or the center hollowing  
20 3 is thus not involved by the machining according to figure 2.

After said operations, there is thus obtained a glass the cross-section of which appears in figure 3. The glass with the cross-section according to said figure 3, bears  
25 the general reference numeral 4. In a further stage, use is then made of an implement or head 5 with a convexity which complies with the hollowing 3 of glass 4. The center hollowing 3 is machined with a coarse-grain finishing pad 6 and directly thereafter with a finer-grain finishing pad (not shown).

30 Now to remove the sharp circular edge 7 and to obtain the final product, which fulfills all the aesthetic criterions, use is now made of an implement or head 8 with a convexity which complies with the curvature B of convex

edge 2 from glass 4. On said head 8 an intermediate part 9 from resilient material is secured, at least that side thereof facing finishing pad 10 is water-impermeable. Said portion of intermediate part 9 is shown with reference numeral 11. By  
5 exerting enough pressure on intermediate part 9, thus also on finishing pad 10, there is machined not only the concave-rising margin portion 2, but also said sharp circular edge 7. That pressure which is exerted by head 8 on intermediate part 9 and the resiliency of the material said intermediate part 9  
10 is made of, are so selected as to have the angle between margin portion 2 and center hollowing 3 be finished convexly, as it is clear from figure 5. Said convex transition area is shown in 12 in figure 5.

The center hollowing may then be polished in  
15 the conventional way by making use of a polishing pad on head 5.

During the following stage, again by making use of an intermediate part 9 secured on head 8, and of a suitable polishing pad, the margin area 2 and the convex radiusing  
20 12 are polished.

With said various operations, there is formed between the margin area 2 and convex hollowing 3, a very gradual smooth transition, while the glass edge thickness may be more or less reduced depending on the selection of the visual  
25 field.

It appears clearly from the above-described method, that the edge thickness of the thus-machined glass may be markedly reduced, but mostly that the gradual transition between the margin area and the center hollowing, which determines the field of view, does not only satisfy the desired aesthetic  
30 criteria, but also does not result in any disturbing effect for the glass wearer.

There is also given the possibility to let the

field of view vary depending on the requirement of each patient,  
always with a marked improvement in the aesthetics of the  
glass. When the glasses have to be ground inner torus-like,  
this may also be made without disturbing the working of the  
5 method according to the invention.

The possibilities given with the invention will  
appear from the tables in the following pages.

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Table 1 Spectacle-glasses with 65 mm  $\Phi$ 

Diopter/Sf.	Field of view in mm.						
	$\Phi$ 54	$\Phi$ 50	$\Phi$ 46	$\Phi$ 42	$\Phi$ 38	$\Phi$ 34	$\Phi$ 30
- 3	4	3.8	3.5	3.2	3.1	2.7	2.1
- 4	5	4.7	4.5	4	3.4	3.2	3
- 5	6.5	6	5.5	4.5	4	3.6	3.2
- 6	7.5	7	6.5	6	5.5	4.5	3.7
- 7	8	7.5	7	6.5	6	5	4
- 8	9	8.5	7.5	7	6.5	6	5
- 9	10	9.5	9	7.5	7	6.5	5.5
-10	11	10.5	9.5	9	8	7.5	6.5
-11	12.5	11.5	10	9.5	8.5	8	7
-12	13.5	12.5	11.5	10	9	8.5	7.5
-13	14	13	11	10.5	9.5	9	8
-14	14.5	14	12	11	10	9.5	8.5
-15	-	15	14	12.5	11	10	9
-16	-	16.5	15	14	11.5	10.5	9.5
-17	-	-	15.5	14.5	12	11	10
-18	-	-	16	15	13	11.5	11
-19	-	-	16.5	16	13.5	12.5	12
-20	-	-	-	16.5	14	13	12.5
-21	-	-	-	-	15.5	12	11

Table 2 Spectacle-glasses with 70 mm  $\Phi$ 

Diop- ter/Sf.	Field of view in mm.						
	$\Phi$ 54	$\Phi$ 50	$\Phi$ 46	$\Phi$ 42	$\Phi$ 38	$\Phi$ 34	$\Phi$ 30
- 3	4.5	4.2	3.9	3.5	3	2.5	2
- 4	5.5	5	4.5	4	3.5	3	2.5
- 5	6.5	5.5	5	4.5	4	3.5	3
- 6	7.5	7	6.5	5.5	5	4.5	4
- 7	8.5	8	7	6.5	6	5	4.5
- 8	10	9	8.5	8	7.5	6.5	6
- 9	11	10	9	8.5	8	7	6.5

Table 3 Spectacle-glasses with 75 mm  $\Phi$ 

Diop- ter/Sf.	Field of view in mm.						
	$\Phi$ 54	$\Phi$ 50	$\Phi$ 46	$\Phi$ 42	$\Phi$ 38	$\Phi$ 34	$\Phi$ 30
- 3	5	4.5	4	3.5	3	2.5	2
- 4	6	5	4.5	4	3.5	3	2.5
- 5	7.5	6.5	6	5	4.5	4	3
- 6	8	7.5	6.5	6	5.5	4.5	4
- 7	8.5	8	7.5	6.5	6	5	4.5

CLAIMS

1. Method for manufacturing a spectacle-glass for myopes, whereby one starts for simplicity sake from a semi-finished glass, that is a glass which has on the inner side, a slight concave hollowing, in which in accordance with the desired diopter value, the required curvature, and with torus-like grinding, the so-called cross-curvature is computed, and according to the desired field of view, a second curvature is computed, whereafter the glass is arranged in a generator and a center hollowing (3) is milled according to the basic curvature, while thereafter the glass edge (2) around the center hollowing (3) is milled according to said second curvature, and the center hollowing (3) of the thus-machined glass is finished, respectively polished, by using a tool with convex radiusing which corresponds to the basic curvature, whereafter the edge (2) is subjected to at least one finishing operation and one polishing operation by using an implement with a convex radiusing which corresponds to said second curvature, whereby moreover use is made of a resilient intermediate part between said implement and a finishing pad, respectively polishing pad.

2. Method as defined in claim 1, in which use is made for said resilient intermediate part (9), of a material with a resiliency which is enough to finish the edge (2) about the center hollowing (3), or respectively polish same.

3. Method as defined in either one of claims 1 and 2, in which use is made for said intermediate part (9), of a material which is water-impermeable at least on that side which will engage the finishing or polishing pad.

4. Method as defined in any one of claims 1-3, in which a pressure is exerted on said intermediate part (9) which is strong enough to finish, respectively polish convexly the edge (2) about the center hollowing (3) and the transition between the center hollowing (3) and the edge (2).

5. Method as defined in any one of claims 1-4, in which after finishing the edge (2), said edge (2) is subjected to a polishing operation by making use of said intermediate part (9).

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Fig.1.

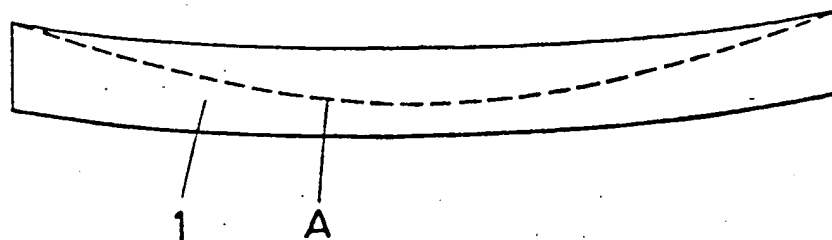


Fig.2.

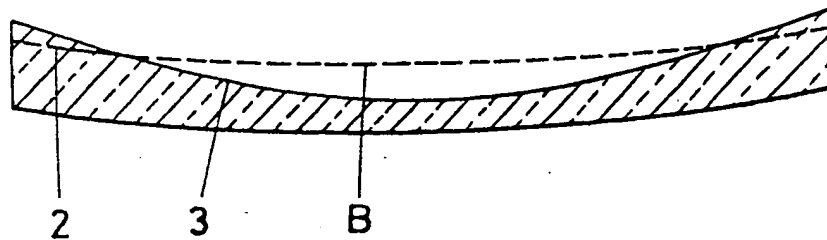


Fig.3.

